

WE CLAIM:

1. A substantially purified metal binding protein having an amino acid sequence analogous to at least one metal binding protein from a brine shrimp (*Artemia*).

2. The substantially purified metal binding protein of claim 1 including an amino acid sequence selected from the group consisting of:

(1) MET ASP CYS CYS LYS ASP GLY CYS THR CYS ALA PRO ASP CYS LYS CYS ALA LYS ASP CYS LYS CYS CYS LYS GLY CYS GLU CYS LYS SER ASP PRO GLU CYS LYS CYS GLU LYS ASP CYS SER CYS ASP SER CYS GLY CYS HIS STOP [SEQ ID NO:2];

(2) MET ASP CYS CYS LYS ASP GLY CYS THR CYS ALA PRO ASP CYS LYS CYS ALA LYS ASP CYS LYS CYS [SEQ ID NO:4]; and

(3) sequences incorporating one or more conservative amino acid substitution³ thereof.

3. An isolated nucleic acid comprising DNA having at least 80% sequence identity to a DNA molecule having the sequence of nucleotide residues 1 to 66 of:

5'- ATG GAC TGC TGC AAG AAC GGT TGC ACC TGT GCC CCA AAT TGC AAA TGT GCC AAA GAC TGC AAA TGC TGC AAA GGT TGT GAG TGC AAA AGC AAC CCA GAA TGC AAA TGT GAG AAG AAC TGT TCA TGC AAC TCA TGT GGT TGT CAC TGA-3' [SEQ ID NO:1].

4. The substantially purified metal binding protein of claim 1 on a support.

5. A vector including the nucleic acid sequence of claim 3.

6. A metal binding composition comprising a substantially purified metal binding protein having an amino acid sequence analogous to a metal binding domain of a metal binding protein from a brine shrimp (*Artemia*).

7. A method for reducing the concentration of a metal in a substrate, said method comprising the steps of:

contacting a metal binding protein having an amino acid sequence analogous to at least one metal binding protein from a brine shrimp (*Artemia*) with said substrate to bind said metal to said metal binding protein; and

separating said bound metal from said substrate.

8. The method of claim 7 wherein said substrate is a fluid.

9. The method of claim 7 wherein said substrate is soil.

10. The method of claim 7 wherein said contacting step is under a high temperature condition.

11. A method for the removal of metal from metal contaminated waste, said method comprising the steps of;

contacting a metal binding protein having an amino acid sequence analogous to at least one metal binding protein sequence from a brine shrimp (*Artemia*) with said metal contaminated waste to bind said metal binding protein to said metal in said metal contaminated waste; and

separating said a bound metal from said contacted metal contaminated waste:

12. The method of claim 11 further comprising the additional step of:
producing the metal binding protein in a modified organism.
13. The method of claim 7 wherein said metal binding protein is coupled to a support.
14. The method of claim 11 wherein said metal binding protein is coupled to a support.
15. A modified organism producing a metal binding protein having an amino acid sequence substantially similar to SEQ ID NO:2 and conservative amino acid substitutions thereof.
16. The modified organism of claim 15 wherein said modified organism is a transgenic plant.
17. The modified organism of claim 15 wherein said modified organism is a transgenic shrimp.
18. The modified organism of claim 15 wherein said modified organism is a bacteria.
19. A method for producing at least one metal binding protein having an amino acid sequence analogous to at least one metal binding protein from a brine shrimp (*Artemia*) comprising the steps of:
providing an expression system capable of producing at least one metal binding protein;

producing at least one metal binding protein having an amino acid sequence analogous to at least one metal binding protein from a brine shrimp (*Artemia*) utilizing said expression system; and

isolating said at least one metal binding protein having an amino acid sequence analogous to at least one metal binding protein from a brine shrimp (*Artemia*) from said expression system.